Michigan Energy Code Training and Implementation Program
1.0 Hour Advanced Program Course Number 16201
Residential Energy Air Sealing

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Presenters

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Course Number: 16201

1 Hour Specialty:
   BI, MI, or registrants with only BO/PR but no inspector registration
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Project Support

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Project Objectives

To train building officials, inspectors, home builders, subcontractors, suppliers, engineers and architects in the air sealing requirements of the Michigan energy code for the purpose of:

1. Increasing understanding
2. Improving compliance
3. Reducing administrative time
4. Improving customer relationships
Presentation Overview

- Air Sealing Locations
- Testing Option (Blower Door)
- Visual Inspection Option
Project Objectives

To train building officials, inspectors, home builders, subcontractors, suppliers, engineers and architects in the revised Michigan energy code for the purpose of:

1. Increasing understanding
2. Improving compliance
3. Reducing administrative time
4. Improving customer relationships

Go To:  www.energycodes.gov  
Date visited: 3/14/2011
Air leakage requirements of the 2009 MUEC are **MANDATORY** provisions.

This means they are required for all compliance approaches:

- Prescriptive
- Trade-off
- Performance
Demonstrate Compliance

Prescriptive

"Prescriptive Packages Approach"

Trade-off

"Trade-off Approach" (UA)

Performance

"Performance Approach"

REScheck™

Demonstrate Compliance: 3 Options

- **Prescriptive**
  - R-values
    - 402.1.1
  - or
  - U-factor
    - 402.1.3

- **“UA” Alternatives**
  - Total Building UA
    - 402.1.4

- **Simulated Performance (software)**
  - Simulated Performance Alternative
    - 405

All must meet the air leakage requirements of Section 402.4!

Residential Requirements of the 2009 IECC. U. S. DOE Building Energy Codes Program.
Identify Conditioned Spaces

An area or room within a building being heated or cooled, containing un-insulated ducts, or with a fixed opening directly into an adjacent conditioned space.

Building Thermal Envelope (Section 402.4.1)

Building thermal envelope shall be:

• Durably sealed to limit infiltration
• Allow for expansion and contraction between dissimilar materials
• 12 specific locations shall be sealed with an air barrier material, suitable film, or solid material
Air sealing locations:

- Joints, seams, and penetrations
- Between windows and doors and their jambs and framing
Air sealing locations:

- Utility penetrations
- Walls and ceilings between a garage and conditioned spaces

Residential Requirements of the 2009 IECC. U. S. DOE Building Energy Codes Program.
Building Thermal Envelope (Section 402.4.1)

Air sealing locations:

- Chases or dropped ceilings adjacent to the thermal envelope
- Attic access openings
More common air sealing locations:

- Site-built windows, doors, and skylights
- Knee walls
- Behind tubs and showers on exterior walls
- Common walls between dwelling units for multi-family
- Rim joist junctions
- Other sources of infiltration
Typical air infiltration locations:

- Windows and doors
- Between sole plates
- Floors and exterior wall panels
- Plumbing
- Electrical
- Service access doors or hatches
- Recessed light fixtures
- Rim joist junction
Must be demonstrated by one of the following:

- Testing option (blower door) *(Section 402.4.2.1)*
- Visual inspection option *(Section 402.4.2.2)*
Testing Option *(Section 402.4.2.1)*

Blower door:

- Air leakage maximum 7 ACH
- Tested at 50 Pa (1 psf)
- Tested AFTER rough in and all penetrations installed

**Presenter’s Note:** Earlier versions of IECC 2009 listed 33.5 psf—corrected to 1 psf in later versions
During the blower door testing:

- Windows, doors, fireplace doors, and stove doors closed but not sealed
- Dampers closed but not sealed
- Interior doors open
- Openings for continuous ventilation systems and heat recovery ventilators closed and sealed
- Heating and cooling systems turned off
- HVAC ducts not sealed
- HVAC supply and return registers not sealed

Residential Requirements of the 2009 IECC. U. S. DOE Building Energy Codes Program.
Visual Inspection Option *(Section 402.4.2.2)*

- Requires field verification of applicable components of Table 402.4.2
- Building Official may require independent third party inspection
Visual inspection locations

**Air and thermal barriers:**

• For framed walls, exterior insulation in substantial contact and continuous alignment with envelope air barrier
• Fill or repair breaks or joints in air barrier
• Air-permeable insulation not used as sealant
• Air-permeable insulation inside of an air barrier
Visual inspection locations

Ceiling/attic:

- For dropped ceilings or soffits, air barrier aligned with insulation and gaps sealed
- Seal attic access, pull down stair, or knee wall door (except for unvented attics)
Visual inspection locations

Walls:

- Insulation installed at corners and headers
- Sill plate sealed at foundation
Visual Inspection Option (Section 402.4.2.2)

Visual inspection locations

Doors and windows:

• Sealed between all door and window jambs and framing

Visual Inspection Option *(Section 402.4.2.2)*

Visual inspection locations

**Rim joists:**

- Insulated and includes an air barrier
Visual Inspection Option (Section 402.4.2.2)

Visual inspection locations

Floors:

• Insulation in stalled in permanent contact with underside of decking
• Any exposed edges of insulation covered by an air barrier

Visual inspection locations

Crawl space walls:

- Insulation permanently attached
- Class I vapor retarder with taped overlapping joints covering exposed earth in unvented crawl spaces

Residential Requirements of the 2006 IECC. U. S. DOE Building Energy Codes Program.
Visual Inspection Option (Section 402.4.2.2)

Visual inspection locations

Shafts and penetrations:

- Sealed duct shafts, utility penetrations, knee walls, and flue shafts opening to unconditioned spaces
Visual inspection locations

Recessed lighting:

- Air tight, IC rated, and sealed to drywall
- Exception: fixtures installed in conditioned spaces
Visual inspection locations

Plumbing and wiring:

- Insulation placed between exterior sheathing and pipes
- Batt insulation cut to fit around wiring and pipes or spray/blown insulation placed between exterior sheathing and pipes or wires
Visual Inspection Option (Section 402.4.2.2)

Visual inspection locations

Electrical boxes on exterior walls:

• Air sealed boxes installed or air barrier to extend behind boxes
Visual inspection locations

HVAC register boots:

• Boots penetrating envelope sealed to drywall or subfloor
Visual Inspection Option *(Section 402.4.2.2)*

Visual inspection locations

**Narrow cavities:**
- Batts cut to fit or cavity filled with sprayed/blown insulation

**Garage separation:**
- Air sealed between garage and conditioned spaces

**Shower/tub on exterior wall:**
- Insulation and air barrier separating shower/tub and exterior wall

**Common wall:**
- Air barrier between dwelling units

**Fireplace:**
- Air barrier included for fireplace walls
Fireplaces (Section 402.4.3)

New wood-burning fireplaces shall have gasketed doors and outdoor combustion air.
Fenestration Air Leakage (Section 402.4.4)

- Maximum infiltration rate of 0.3 cfm/sf
- Maximum rate of 0.5 cfm/sf for swinging doors
- NFRC 400 or AAMA/WDMA/CSA 101/I.S.2/A440
- Must be listed and labeled
- Site-built windows, skylights and doors are **exempt** from the leakage test

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Recessed Lighting (Section 402.4.5)

Recessed lighting fixtures in the thermal envelope must meet one of the following:

- Type IC rated and labeled in a sealed or gasketed enclosure
- Type IC rated and labeled as meeting ASTM E 283
- Michigan provides for installation of a non-IC rated fixture in a fire-rated box with insulation over

All recessed lighting must be sealed with a gasket or caulk between the housing and interior wall or ceiling covering
